E 3510-22-P

**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**[RTID 0648-XC220]**

# Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Geophysical Surveys at the Cascadia Subduction Zone and Juan de Fuca Plate in the Northeast Pacific Ocean

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Notice; issuance of an incidental harassment authorization.

**SUMMARY:** In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Lamont-Doherty Earth Observatory (L-DEO) to incidentally harass, by Level B harassment only, marine mammals during geophysical surveys in the Northeast Pacific Ocean.

**DATES:** This Authorization is effective from August 1, 2022 through July 31, 2023.

**FOR FURTHER INFORMATION CONTACT:** Kim Corcoran, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-research-and-other-activities*. In case of problems accessing these documents, please call the contact listed above.

**SUPPLEMENTARY INFORMATION**:

## Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary

of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental harassment authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth.

The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

**Summary of Request**

On December 14, 2021, NMFS received a request from L-DEO for an IHA to take marine mammals incidental to a marine geophysical survey off the coasts of Oregon and Washington in the northeast Pacific Ocean. The application was deemed adequate and complete on April 4, 2022. L-DEO request is for take of small numbers of 23 species of marine mammals by Level B harassment only. Neither L-DEO nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS previously issued an IHA to L-DEO for larger surveys in a similar location in the Northeast Pacific (*e.g.,* 86 FR 29090; May 28, 2021; 84 FR 35073; July 22, 2019). These surveys, however, included survey areas much closer to the coast. L-DEO complied with all the requirements (*e.g.,* mitigation, monitoring, and reporting) of the previous IHAs and information regarding their monitoring results may be found in the **Description of Marine Mammals in the Area of Specified Activities** section.

**Description of Activity**

*Overview*

Researchers from New Mexico Institute of Mining and Technology (NMT) and Oregon State University (OSU), with funding from the U.S. National Science Foundation (NSF) plan to conduct low-energy seismic surveys from the Research Vessel (R/V) *Marcus G. Langseth* (*Langseth*), which is owned and operated by Lamont-Doherty Earth Observatory (L-DEO) of Columbia University, at the Cascadia subduction Zone and Juan de Fuca Plate in the Northeast Pacific Ocean during Summer 2022. The two-dimensional (2-D) seismic surveys will occur within the Exclusive Economic Zone (EEZ) of the United States, in waters deeper than 1600 meters (m). To complete this survey, the R/V *Langseth* will tow a Generator-Injector (GI)-airgun cluster consisting of two 45 cubic inch ($in^3$) GI guns spaced 2.46 m apart, with a total discharge volume of 90 $in^3$. The acoustic source will be towed at 2 to 4 m deep along the survey lines, while the receiving system is towed in an 800-1400 m long hydrophone streamer.

*Dates and Duration*

The survey is expect to last for 23 days, with approximately six days of seismic operations, three days of transit and 14 days of heat flow measurements. R/V *Langseth* will leave out of and return to port in Newport, OR, during summer 2022.

*Specific Geographic Region*

The survey will occur within ~42-47◦N, ~125-127◦W off the coast of Washington and Oregon in the Northeast Pacific ocean. Four regions where the surveys are to occur are depicted in Figure 1; the tracklines could occur anywhere within the boxes shown in Figure 1. No representative survey tracklines are shown, as actual track lines and order of survey operations are dependent on science objectives and weather. The surveys will occur within the EEZ of the U.S., in waters >1600 m deep.

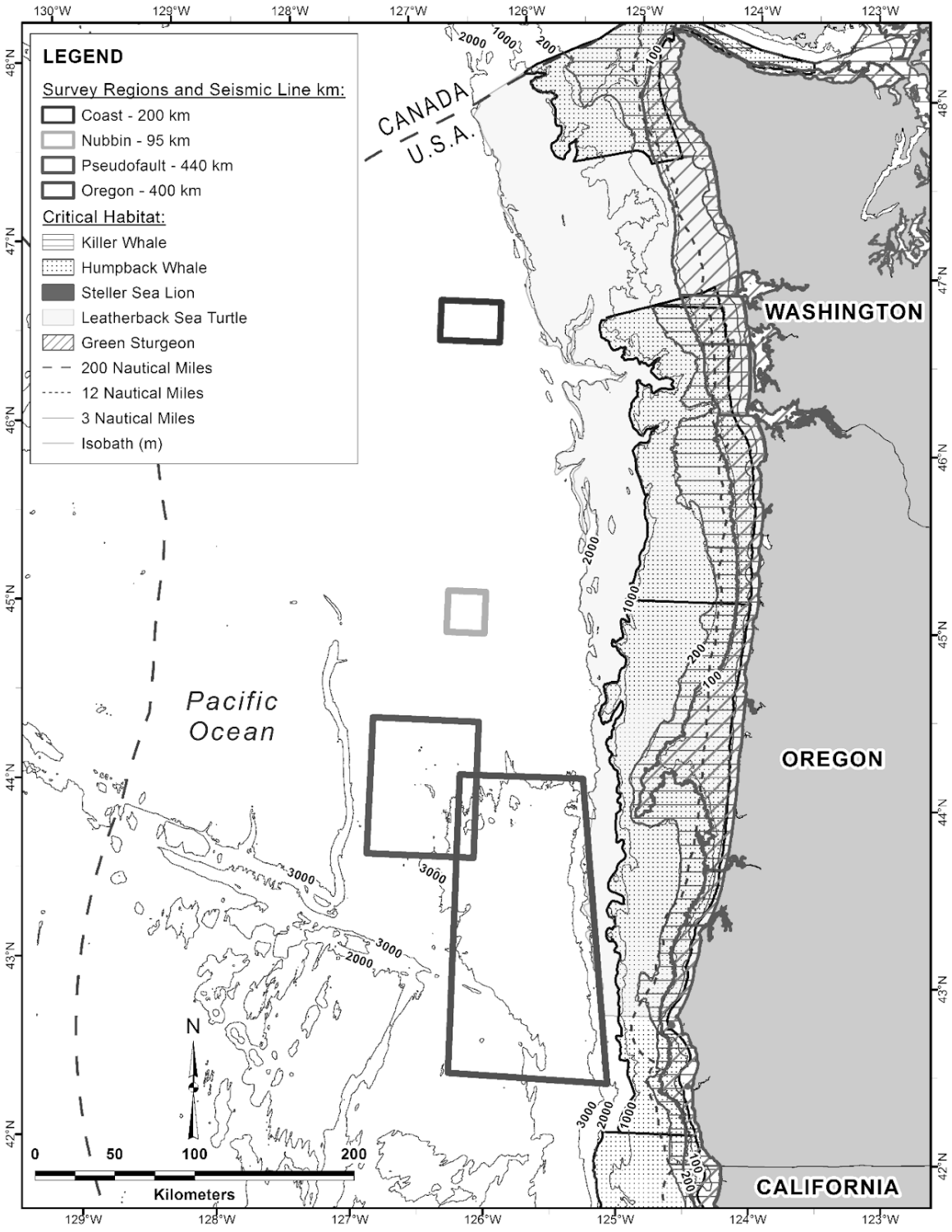


**Figure 1 – Map of Survey Area offshore of Oregon and Washington.**

A detailed description of the planned geophysical survey is provided in the **Federal Register** notice for the proposed IHA (87 FR 37560; June 23, 2022). Since that time, no changes have been made to the planned survey activities. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of specified activity.

Mitigation, monitoring, and reporting measures are described in detail later in this document (please see Mitigation and Monitoring and Reporting).

**Comments and Responses**

A notice of proposed IHA was published to the **Federal Register** on June 23, 2022 (87 FR 37560). That notice described, in detail, L-DEO's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS did not receive any public comments.

**Changes from the Proposed IHA to Final IHA**

The addition of the requirement for the survey operator to provide Protected Species Observers (PSOs) with a night-vision device suited for the marine environment has been added for use during nighttime ramp-up pre-clearance. This requirement was proposed by L-DEO in their application, and has previously been required in recently issued IHAs for similar surveys, but inadvertently left out of the notice of proposed IHA and the draft IHA. There have been no other changes between the proposed and final IHA.

**Description of Marine Mammals in the Area of Specified Activities**

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, incorporated here by reference, instead of reprinting the

information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 1 lists all species or stocks for which take is authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprise that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Pacific SARs (Carretta *et al.,* 2021). All values presented in Table 1 are the most recent available at the time of publication and are available in the 2020 SARs (Carretta *et al.,* 2021) and draft 2021 SARs (available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports*).

## Table 1. Species Likely Impacted by the Specified Activities

| Common name | Scientific name | Stock | ESA/MMPA status; Strategic (Y/N)[1] | Stock abundance (CV, Nmin, most recent abundance survey)[2] | PBR | Annual M/SI[3] |
|---|---|---|---|---|---|---|
| Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales) | | | | | | |
| Family Balaenopteridae (rorquals) | | | | | | |
| Humpback whale | *Megaptera novaeangliae* | California/Oregon/Washington | -,-,Y | 4973 (0.05, 4776, 2018) | 28.7 | >48.6 |
| Minke whale | *Balaenoptera acutorostrata* | California/Oregon/Washington | -,-,N | 915 (0.792, 509, 2018) | 4.1 | >0.59 |
| Sei whale | *Balaenoptera borealis* | Eastern North Pacific | E, D, Y | 519 (0.4, 374, 2014) | 0.75 | >0.2 |
| Fin whale | *Balaenoptera physalus* | California/Oregon/Washington | E, D, Y | 11065 (0.405, 7,970, 2018) | 80 | >2.2 |
| Blue whale | *Balaenoptera musculus* | Eastern North Pacific | E, D, Y | 1898 (0.085, 1767, 2018) | 4.1 | >19.4 |
| Superfamily Odontoceti (toothed whales, dolphins, and porpoises) | | | | | | |
| Family Physeteridae | | | | | | |
| Sperm whale | *Physeter macrocephalus* | California/Oregon/Washington | E, D, Y | 1997 (0.57, 1270, 2014) | 2.5 | 0.6 |
| Family Kogiidae | | | | | | |
| Pygmy sperm whale | *Kogia breviceps* | California/Oregon/Washington | -,-,N | 4111 (1.12, 1924, 2014) | 19 | 0 |
| Dwarf sperm whale | *Kogia sima* | California/Oregon/Washington | -,-,N | UNK (UNK, UNK, 2014) | UND | 0 |
| Family Ziphiidae (beaked whales) | | | | | | |
| Baird's beaked whale | *Berardius Bairdii* | California/Oregon/Washington | -,-,N | 1363 (0.53, 894, 2018) | 8.9 | >0.2 |
| Cuvier's beaked whale | *Ziphius cavirostris* | California/Oregon/Washington | -,-,N | 3274 (0.67, 2059, 2014) | 21 | <0.1 |
| Mesoplodont Beaked Whales | *Mesoplodon* spp. | California/Oregon/Washington | -,-,N | 3044 (0.54, 1967, 2005) | 20 | 0.1 |
| Family Delphinidae | | | | | | |
| Striped dolphin | *Stenella coeruleoalba* | California/Oregon/Washington | -,-,N | 29,988 (0.3, 23448, 2018) | 225 | >4 |
| Short-beaked common dolphin | *Delphinus delphis* | California/Oregon/Washington | -,-,N | 1,056,308 (0.21, 888971, 2018) | 8889 | >30.5 |
| Pacific white-sided dolphin | *Lagenorhynchus obliquidens* | California/Oregon/Washington | -,-,C | 34,998 (0.222, 29090, 2018) | 279 | 7 |
| Northern right whale dolphin | *Lissodelphis borealis* | California/Oregon/Washington | -,-,N | 29285 (0.72, 17024, 2018) | 163 | >6.6 |
| Risso's dolphin | *Grampus griseus* | California/Oregon/Washington | -,-,N | 6336 (0.32, 4817, 2014) | 46 | >3.7 |
| Killer whale | *Orcinus orca* | West Coast Transient | -,-,N | 349 (N/A, 349, 2018) | 3.5 | 0.4 |
| | | North Pacific Offshore | -,-,N | 300 (0.1, 276, 2012) | 2.8 | 0 |
| Family Phocoenidae (porpoises) | | | | | | |
| Dall's porpoise | *Phocoenoides dalli* | California/Oregon/Washington | -,-,N | 16498 (0.61, 10286, 2019) | 99 | >0.66 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Order Carnivora – Superfamily Pinnipedia | | | | | | |
| Family Otariidae (eared seals and sea lions) | | | | | | |
| Northern fur seal | *Callorhinus ursinus* | Eastern Pacific | -,D,Y | 626,618 (0.2, 530376, 2020) | 11403 | 373 |
| | | California | -,D,Y | 14050 (N/A, 7524, 2013) | 451 | 1.8 |
| Guadalupe fur seal | *Arctocephalus townsendi* | Mexico | T, D, Y | 34187 (N/A, 31019, 2013) | 1062 | >3.8 |
| Steller sea lion | *Eumetopias jubatus* | Eastern | -,-,N | 43201 (N/A, 43201,2017) | 2592 | 112 |
| California sea lion | *Zalophus californianus* | United States | -,-,N | 257606 (N/A, 233525, 2014) | 14011 | >320 |
| Family Phocidae (earless seals) | | | | | | |
| Northern elephant seal | *Mirounga angustirostris* | California Breeding | -,-,N | 187386 (N/A, 85369, 2013) | 5122 | 5.3 |

[1] - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] - NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports.* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

[3] - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

As indicated above, all 23 species (with 25 managed stocks) in Table 1 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. All species that could potentially occur in the planned survey areas are included in Table 3 of the IHA application.

A detailed description of the species likely to be affected by the geophysical surveys, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in L-DEO's IHA application and summarized in the **Federal Register** notice for the proposed IHA (87 FR 37560; June 23, 2022); since that time, we are not aware of any changes in the status of these species and stocks; therefore detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to the NMFS' website (*https://www.fisheries.noaa.gov/find-species)* for generalized species accounts.

*Marine Mammal Hearing*

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 2.

**Table 2. Marine Mammal Hearing Groups (NMFS, 2018).**

| Hearing Group | Generalized Hearing Range* |
|---|---|
| Low-frequency (LF) cetaceans (baleen whales) | 7 Hz to 35 kHz |
| Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales) | 150 Hz to 160 kHz |
| High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*) | 275 Hz to 160 kHz |
| Phocid pinnipeds (PW) (underwater) (true seals) | 50 Hz to 86 kHz |
| Otariid pinnipeds (OW) (underwater) (sea lions and fur seals) | 60 Hz to 39 kHz |

***** Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

**Potential Effects of Specified Activities on Marine Mammals and their Habitat**

The effects of underwater noise from L-DEO's survey activities have the potential to result in behavioral harassment of marine mammals in the vicinity of the survey area. The notice of proposed IHA (87 FR 37560; June 23, 2022) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from L-DEO on marine mammals and their habitat. That information and analysis is incorporated by reference into this final IHA determination and is not repeated here; please refer to the notice of proposed IHA (87 FR 37560; June 23, 2022).

**Estimated Take**

This section provides an estimate of the number of incidental takes for authorization through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes will be by Level B harassment only, primarily in the form of behavioral disruption and including through Temporary Threshold Shift (TTS) for low frequency cetaceans resulting from exposure to sound from seismic airguns. TTS is not expected for all other hearing groups and is considered to be unlikely for low frequency cetaceans. Given the small size of the Level A harassment isopleths (28.6 m for LF cetaceans and less than one meter for all other species) and the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown, ramp-up, *etc.*) discussed in detail below in **Mitigation** section, Level A harassment is neither anticipated nor to be authorized.

As described previously, no serious injury or mortality is anticipated or is authorized for this activity. Below we describe how the take numbers are estimated.

Generally speaking, we estimate take by considering: (1) Acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and (4) and the number of days of activities. We note that while these basic factors can contribute to a basic

calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimate.

*Acoustic Thresholds*

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

*Level B Harassment* – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 μPa)) for continuous (*e.g.,* vibratory pile-driving, drilling) and above RMS SPL 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

L-DEO's survey includes the use of impulsive seismic sources (*e.g.,* GI-airgun) and therefore the 160 dB re 1 µPa (rms) criteria is applicable for analysis of Level B harassment.

*Level A harassment* – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). L-DEO's survey includes the use of impulsive and intermittent sources.

For more information, see NMFS' 2018 Technical Guidance, which may be accessed at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

*Ensonified Area*

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The 2D survey will acquire data using a 2 GI-airgun cluster with a total discharge volume of 90 $in^3$ at a maximum tow depth of 2-4 m. L-DEO model results are used to determine the 160 dB rms radius for the 2-GI airgun array in deep water (>1000 m) down to a maximum depth of 2000 m, as animals are generally not anticipated to dive below 2000 m (Costa and Williams, 1999). Received sound levels for the two 45 $in^3$ GI airguns have been predicted by L-DEO's model (Diebold *et al.,* 2010) as a function of distance from the airguns. This modeling approach uses ray tracing for the direct wave traveling from the array to the receiver and its associated source ghost (reflection at the air-water interface in the vicinity of the array), in a constant-velocity half-space (infinite homogeneous ocean layer, unbounded by a seafloor). In addition, propagation

measurements of pulses from a 36-airgun array at a tow depth of 6 m have been reported in deep water (~1600 m), intermediate water depth on the slope (~600-1100 m), and shallow water (~50) in the Gulf of Mexico in 2007-2008 (Tolstoy *et al.,* 2009; Diebold *et al.,* 2010).

For deep and intermediate-water cases, the field measurements cannot be used readily to derive mitigation radii, as at those sites the calibration hydrophone was located at a roughly constant depth of 350-500 m, which may not intersect all the sound pressure relevant water depth (~2000 m) for marine mammals. At short ranges, where the direct arrivals dominate and the effects of seafloor interactions are minimal, the data recorded at the deep sites are suitable for comparison with modeled levels at the depth of the calibration hydrophone. At longer ranges, the comparison with the mitigation model – constructed from the maximum SPL through the entire water column at varying distances from the airgun array – is the most relevant.

In deep and intermediate-water depths, comparisons at short ranges between sound levels for direct arrivals recorded by the calibration hydrophone and model results for the same array tow depth are in good agreement (Fig. 12 and 14 in Appendix H of L-DEO's PEIS). Consequently, isopleths falling within this domain can be predicted reliably by the L-DEO model, although they may be imperfectly sampled by measurements recorded at a single depth. At greater distances, the calibration data show that seafloor-reflected and sub-seafloor-refracted arrivals dominate, whereas the direct arrivals become weak and/or incoherent. Aside from local topography effects, the region around the critical distance is where the observed levels rise closest to the mitigation model curve. However, the observed sound levels are found to fall almost entirely below the mitigation model curve. Thus, analysis of the Gulf of Mexico calibration measurements demonstrate that although simple, the L-DEO model is a robust tool for

conservatively estimating isopleths and the deep water radii obtained from model results down to a maximum water depth of 2000 m.

A recent retrospective analysis of acoustic propagation of R/V *Langseth* sources in a coastal/shelf environment from the Cascadia Margin off Washington suggests that predicted (modeled) radii (using a similar approach) for R/V *Langseth* sources were 2-3 times larger than measured in shallow water (Crone *et al.,* 2014). Similarly, data collected by Crone *et al.* (2017) during a survey off New Jersey in 2014 and 2015 confirmed that in situ measurements and estimates of the 160- and 180-dB distances collected by R/V *Langseth* hydrophone streamer were 2-3 times smaller than the predicted operational mitigation radii. Five separate comparisons conducted of the L-DEO model with in situ received level have confirmed that the L-DEO model generated conservative mitigation zones, resulting in significantly larger zones.

The surveys will acquire data with two 45 $in^3$ GI funs at a tow depth of 2-4 m. As the entire survey occurs in deep water (>1000 m), L-DEO used the deep-water radii obtained from the model results explained above down to a maximum warter depth of 2000 m (see Figure A-1 in L-DEO's application). The estimated distances to the Level B harassment isopleth for the survey are shown in Table 3. The acoustic propagation modeling methodologies are described in greater detail in L-DEO's IHA application.

**Table 3. Predicted radial distances to Isopleths Corresponding to the Level B Harassment Threshold (160 dB re 1µPa (rms)).**

| Airgun Configuration | Water Depth (m) | Predicted Distances (m) to a Received Sound Level of 160 dB re 1 $\mu Pa_{rms}$ |
|---|---|---|
| Two 45-$in^3$ GI guns | >1000 | 553 |

Predicted distances to Level A harassment isopleths, which vary based on marine mammal hearing groups, were calculated based on modeling performed by L-DEO using

the PGS Nucleus source modeling software program and the NMFS User Spreadsheet, described below. The acoustic thresholds for impulsive sounds (*e.g.,* airguns) contained in the Technical Guidance were presented as dual metric acoustic thresholds using both $SEL_{cum}$ (cumulative sound exposure level) and peak sound pressure metrics (NMFS 2018). As dual metrics, NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the two metrics is exceeded (*i.e.,* metric resulting in the largest isopleth). The $SEL_{cum}$ metric considers both level and duration of exposure, as well as auditory weighting functions by marine mammal hearing group. In recognition of the fact that the requirement to calculate Level A harassment ensonified areas could be more technically challenging to predict due to the duration component and the use of weighting functions in the new $SEL_{cum}$ thresholds, NMFS developed an optional User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to facilitate the estimation of take numbers.

In order to more realistically incorporate the Technical Guidance's weighting functions over the seismic array's full acoustic band, unweighted spectrum data for the *Langseth's* airgun array (modeled in 1 Hz bands) was used to make adjustments (dB) to the unweighted spectrum levels, by frequency, according to the weighting functions for each relevant marine mammal hearing group. These adjusted/weighted spectrum levels were then converted to pressures (micropascals (μPa)) in order to integrate them over the entire broadband spectrum, resulting in broadband weight source levels by hearing group that could be directly incorporated within the User Spreadsheet (*i.e.,* to override the Spreadsheet's more simple weighting factor adjustment). Using the User Spreadsheet's "safe distance" methodology for mobile sources (described by Sivle *et al.,* 2014) with the hearing group-specific weighted source levels, and inputs assuming spherical spreading propagation and source velocities (2.32 m/s) and shot intervals (every 2.69 s) specific to

the planned survey, potential radial distances to auditory injury zones were then calculated for $SEL_{cum}$ thresholds. Outputs from the User Spreadsheet in the form of estimated distance to Level A harassment isopleths for the survey are shown in Table 4. NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the dual metrics ($SEL_{cum}$ and $Peak_{flat}$) is exceeded (*i.e.,* metric resulting in the largest isopleth).

**Table 4. Modeled Radial Distances (m) to Isopleths Corresponding to Level A Harassment Thresholds**

| Source (volume) | Level A Harassment Zones (m) | | | | |
|---|---|---|---|---|---|
| | LF | MF | HF | Phocid | Otariid |
| Two 45 cu in GI guns | 28.6 | 0 | 0.1 | 0.3 | 0 |

Note that because of some of the assumptions included in the methods used (*e.g.*, stationary receiver with no vertical or horizontal movement in response to the acoustic source), isopleths produced may be overestimates to some degree, which will ultimately result in some degree of overestimation of Level A harassment. However, these tools offer the best way to predict appropriate isopleths when more sophisticated modeling methods are not available. NMFS continues to develop ways to quantitatively refine these tools and will qualitatively address the output where appropriate. For mobile sources, such as the seismic survey, the User Spreadsheet predicts the closest distance at which a stationary animal would not incur PTS if the sound source traveled by the animal in a straight line at a constant speed.

Auditory injury for all species is unlikely to occur given the small modeled zones of injury (estimated zone less than 30 m for low-frequency cetaceans and near zero for all other species). Additionally, animals are expected to have aversive/compensatory behavior in response to the activity (Nachtigall *et al.,* 2018) further limiting the

likelihood of auditory injury for all species. L-DEO did not request authorization of take by Level A harassment, and no take by Level A harassment authorized by NMFS.

*Marine Mammal Occurrence*

In this section we provide information about the occurrence of marine mammals, including density or other relevant information, which will inform the take calculations.

The U.S. Navy (USN) primarily use the Southwest Fishery Science Center (SWFSC) habitat-based cetacean density models to develop a marine species density database for the Northwest Training and Testing Study Area, which encompasses the survey area (USN 2019). For species where density spatial modeling was unavailable, other data sources were used. The USN marine species density database is currently the most comprehensive density data set available for the California Current Ecosystem (CCE) which encompasses waters off the coast of California, Oregon, and Washington. However, GIS data layers are currently unavailable for this database; thus, in this analysis the USN data were only used for species for which density data were not available from an alternative spatially-explicit model (*i.e.,* minke, sei, and killer whales, *Kogia* spp., and pinnipeds).

For most pinnipeds, L-DEO used the highest densities for spring, summer, or fall from USN (2019), but corrected the estimates by projecting the most recent population growth/updated population estimates to 2022, when available. This same approach was used by NMFS for previous L-DEO surveys (*e.g.*, Northeast Pacific Ocean Survey (85 FR 19580; April 7, 2020)) in the region in 2021. For California sea lions, spring densities from USN (2019) were used directly, the density for the '40-70 km from shore' distance band was used for the Oregon survey region, and the density for the '70-450 km from shore' distance band was used for other survey regions. For the northern fur seal, the density for the spring for the 'up to 70 km from shore' distance band was used for the Oregon survey region, and the spring density for the '>130 km from shore' distance band

was used for the other survey regions. For the Guadalupe fur seal and Steller sea lion, summer densities for the '200 m isobath to 300 km from shore' were used. For the gray whale, the summer/fall density for the '10-47 km from shore' distance band (USN 2019) was used for the Oregon survey region and a density of zero was used for all other survey regions. For killer whales, the annual density for all stocks occurring offshore was used from USN (2019).

Spatially-explicit density data from summer/fall from the NOAA CetSound website (NOAA 2022) were used for most other species (*i.e.,* humpback, blue, fin, sperm, Baird's, beaked, and other small beaked whales; striped, short-beaked common, Pacific white-sided, Risso's, and northern right whale dolphins; and Dall's porpoise. CetMap (*https://cetsound.noaa.gov/cda)* provides output of summer/fall habitat-based density models for cetaceans in the CCE (Becker *et al*., 2020) in the form of GIS layers; these were used to calculate takes in the survey area. The density estimates were available in the form of a GIS grid with each cell in the grid measuring ~7 km east-west by 10 km north-south. This grid was intersected with a GIS layer of the area expected to be ensonified to >160 dB SPL from the survey area. North, west, and south boundaries are based on overlap/intersection with geographic extents of all four combined survey regions; eastern grid coverage limit was defined by inclusion of cells that contained >25 percent overlap with the angled boundary of the survey area polygon. The densities from all grid cells overlapping the ensonified areas were averaged to calculate an average species-specific density for each species (Table 5).

**Table 5. Modeled Marine Mammal Density Values and Daily Ensonified Area for L-DEO's Survey***

| Species | Density (#/km2) | Daily Ensonified Area (km2) | Number of Seismic Days | Source |
|---|---|---|---|---|
| **LF Cetaceans** | | | | |
| Humpback whale | 0.000464 | 221 | 6 | Becker *et al.* (2020) |

| | | | | |
|---|---|---|---|---|
| *Blue whale* | 0.000226 | 221 | 6 | Becker *et al.* (2020) |
| *Fin whale* | 0.00241 | 221 | 6 | Becker *et al.* (2020) |
| *Sei whale* | 0.0004 | 221 | 6 | USN (2019) |
| Minke whale | 0.0013 | 221 | 6 | USN (2019) |
| **MF Cetaceans** | | | | |
| *Sperm whale* | 0.002859 | 221 | 6 | Becker *et al.* (2020) |
| Baird's beaked whale | 0.000407 | 221 | 6 | Becker *et al.* (2020) |
| Small beaked whale | 0.002446 | 221 | 6 | Becker *et al.* (2020) |
| Striped dolphin | 0.002095 | 221 | 6 | Becker *et al.* (2020) |
| Short-beaked common dolphin | 0.004845 | 221 | 6 | Becker *et al.* (2020) |
| Pacific white-sided dolphin | 0.059902 | 221 | 6 | Becker *et al.* (2020) |
| Northern right-whale dolphin | 0.049535 | 221 | 6 | Becker *et al.* (2020) |
| Risso's dolphin | 0.009917 | 221 | 6 | Becker *et al.* (2020) |
| Killer whale | 0.00092 | 221 | 6 | USN (2019) |
| **HF Cetaceans** | | | | |
| Pygmy/dwarf sperm whale | 0.00163 | 221 | 6 | USN (2019) |
| Dall's porpoise | 0.093613 | 221 | 6 | Becker *et al.* (2020) |
| **Otariid Seals** | | | | |
| Northern fur seal | 0.036115/0.032983* | 221 | 6 | USN (2019) |
| *Guadalupe fur seal* | 0.02945 | 221 | 6 | USN (2019) |
| California sea lion | 1.2951/0.0714* | 221 | 6 | USN (2019) |
| Steller sea lion | 0.002573 | 221 | 6 | USN (2019) |
| **Phocid Seal** | | | | |
| Northern elephant seal | 0.043301 | 221 | 6 | USN (2019) |

*Species in this table differ slightly from those included in L-DEO's application as NMFS has determined that their occurrence in the survey area is rare and unlikely to be encountered. For more information, please see the **Description of Marine Mammals in the Area of Specified Activity** section of this notice.
**Two different densities were used depending on water depth/distance from shore

*Take Estimation*

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and is authorized. In

order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in Level B harassment, radial distances from the airgun array to the predicted isopleth corresponding to the Level B harassment thresholds are calculated, as described above. Those radial distances are then used to calculate the area(s) around the airgun array predicted to be ensonified to sound levels that exceed the Level B harassment threshold. The distance for the 160-dB threshold (based on L-DEO model results) was used to draw a buffer around the area expected to be ensonified (*i.e.,* the survey area). The ensonified areas were then increased by 25 percent to account for potential delays, which is the equivalent to adding 25 percent to the line km to be surveyed. The density for each species in Table 5 were then multiplied by the daily ensonified areas expected to be ensonified, increased by 25 percent, and then multiplied by the number of survey days (6) to estimate the Level B takes.

The marine mammals predicted to occur within these respective areas, based on the estimated densities, are assumed to be incidentally taken. Estimated exposures for the survey are shown in Table 6.

**Table 6. Estimated Take by Level B Harassment, and Percentage of Marine Mammal Stock Population.**

| Species | MMPA Stock | Estimated Take by Level B Harassment | Authorized Take by Level B Harassment | Stock Abundance | Percent of MMPA Stock |
|---|---|---|---|---|---|
| Humpback whale[a] | California/Oregon Washington | 1 | 2[d] | 4973 | 0.04 |
| Blue whale | Eastern North Pacific | 0 | 2[d] | 1898 | 0.11 |
| Fin whale | California/Oregon Washington | 4 | 4 | 11,065 | 0.04 |
| Sei whale | Eastern North Pacific | 1 | 2[d] | 519 | 0.39 |
| Minke whale | California/Oregon Washington | 2 | 2 | 915 | 0.22 |
| Sperm whale | California/Oregon Washington | 5 | 7[d] | 1997 | 0.35 |

| | | | | | |
|---|---|---|---|---|---|
| Baird's beaked whale | California/Oregon Washington | 1 | 9[d] | 1363 | 0.66 |
| Small beaked whale[b] | California/Oregon Washington | 4 | 4 | 3044 | 0.13 |
| Striped dolphin | California/Oregon Washington | 3 | 46[d] | 29,988 | 0.15 |
| Common dolphin | California/Oregon Washington | 8 | 179[d] | 1,056,308 | 0.02 |
| Pacific white-sided dolphin | California/Oregon Washington | 99 | 99 | 34,998 | 0.28 |
| Northern right-whale dolphin | California/Oregon Washington | 82 | 82 | 29,285 | 0.28 |
| Risso's dolphin | California/Oregon Washington | 16 | 22[d] | 6336 | 0.35 |
| Killer whale | West Coast Transient | 2 | 7[d] | 349 | 0.00 |
| | North Pacific Offshore | | | 300 | 0.00 |
| Pygmy/dwarf sperm whale | California/Oregon Washington | 3 | 3 | 4111 | 0.07 |
| Dall's porpoise | California/Oregon Washington | 155 | 155 | 16,498 | 0.94 |
| Northern fur seal[c] | Eastern Pacific | 17 | 17 | 626,618 | 0.00 |
| | California | | | 530,376 | 0.00 |
| Guadalupe fur seal | Mexico | 49 | 49 | 34,187 | 0.14 |
| California sea lion | United States | 9 | 9 | 257,606 | 0.00 |
| Steller sea lion | Eastern | 4 | 4 | 43,201 | 0.01 |
| Northern elephant seal | California Breeding | 62 | 62 | 5122 | 1.21 |

[a]Takes are allocated among the three DPSs in the area based on Wade 2021 (Oregon: 42 percent Central America DPS, 58 percent Mexico DPS; Washington: 6 percent Central America DPS, 25 percent Mexico DPS, 69 percent Hawaii DPS).
[b]Authorized takes include one each of Blainville's beaked whale, Stejneger's beaked whale, Cuvier's beaked whale, and Hubbs' beaked whale (see Appendix B of L-DEO's application for more information).
[c]In cases where multiple stocks are being affected, for the purposes of calculating the percentage of the stock impacted, the take is being analyzed as if all authorized takes occurred within each stock.
[d]Authorized take increased to mean group size from Barlow (2016).

**Mitigation**

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying

particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations.

L-DEO reviewed mitigation measures employed during seismic research surveys authorized by NMFS under previous incidental harassment authorizations, as well as recommended best practices in Richardson *et al.* (1995), Pierson *et al.* (1998), Weir and Dolman (2007), Nowacek *et al.* (2013), Wright (2014), and Wright and Cosentino (2015), and has required mitigation measures based on the above sources.

To reduce the potential for disturbance from acoustic stimuli associated with the activities, L-DEO proposed to implement, and NMFS requires, mitigation measures for

marine mammals. Mitigation measures that will be adopted during the planned survey include, but are not limited to: (1) Vessel speed or course alteration, provided that doing so will not compromise operation safety requirements. (2) GI-airgun shut down within EZs, and (3) ramp-up procedures.

*Vessel-Based Visual Mitigation Monitoring*

Visual monitoring requires the use of trained observers (herein referred to as visual protected species observers (PSOs)) to scan the ocean surface visually for the presence of marine mammals. The area to be scanned visually includes primarily the exclusion zone, within which observation of certain marine mammals requires shutdown of the acoustic source, but also the buffer zone. The buffer zone means an area beyond the exclusion zone to be monitored for the presence of marine mammals that may enter the exclusion zone. During pre-start clearance (*i.e.,* before ramp-up begins), the buffer zone also acts as an extension of the exclusion zone in that observations of marine mammals within the buffer zone will also prevent airgun operations from beginning (*i.e.,* ramp-up). The buffer zone encompasses the area at and below the sea surface from the edge of the 100 m exclusion zone measured from the edges of the airgun array. Visual monitoring of the exclusion zone and adjacent waters is intended to establish and, when visual conditions allow, maintain zones around the sound source that are clear of marine mammals, thereby reducing or eliminating the potential for injury and minimizing the potential for more severe behavioral reactions for animals occurring closer to the vessel. Visual monitoring of the buffer zone is intended to (1) provide additional protection to naïve marine mammals that may be in the area during pre-clearance, and (2) during airgun use, aid in establishing and maintaining the exclusion zone by altering the visual observer and crew of marine mammals that are outside of, but may approach and enter, the exclusion zone.

L-DEO must use independent, dedicated, trained visual PSOs, meaning that the PSOs must be employed by a third-party observer provider, must not have tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements, and must have successfully completed an approved PSO training course. PSO resumes shall be provided to NMFS for approval.

At least one visual PSO must have a minimum of 90 days at-sea experience working in that role during a shallow penetration or low-energy survey, with no more than 18 months elapsed since the conclusion of the at-sea experience. One PSO with such experience shall be designated as the lead for the entire protected species observation team. The lead PSO shall serve as primary point of contact for the vessel operator and ensure all PSO requirements per the IHA are met. To the maximum extent practicable, the experienced PSOs should be scheduled to be on duty with those PSOs with the appropriate training but who have not yet gained relevant experience.

During survey operations (*e.g.,* any day on which use of the acoustic source is planned to occur, and whenever the acoustic source is in the water, whether activated or not), a minimum of two PSOs must be on duty and conducting visual observations at all times during daylight hours (*i.e.,* from 30 minutes prior to sunrise through 30 minutes following sunset) and 30 minutes prior to and during ramp-up of the airgun array, including nighttime ramp-ups. Visual monitoring of the exclusion and buffer zones must begin no less than 30 minutes prior to ramp-up and must continue until one hour after use of the acoustic source ceases or until 30 minutes past sunset. Visual PSOs must coordinate to ensure 360 degree visual coverage around the vessel from the most appropriate observation posts, and must conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner.

PSOs shall establish and monitor the exclusion and buffer zones. These zones shall be based upon the radial distance from the edges of the acoustic source (rather than being based on the center of the array or around the vessel itself). During use of the acoustic source (*i.e.,* anytime airguns are active, including ramp-up) shall be communicated to the operator to prepare for the potential shutdown of the acoustic source.

During use of the airgun, detections of marine mammals within the buffer zone (but outside the exclusion zone) should be communicated to the operator to prepare for the potential shutdown of the acoustic source.

PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hour period.

*Establishment of Exclusion and Buffer Zones*

An exclusion zone (EZ) is a defined area within which occurrence of a marine mammal triggers mitigation action intended to reduce the potential for certain outcome, *e.g.,* auditory injury, disruption of critical behaviors. The PSOs will establish a minimum EZ with a 100 m radius with an additional 100 m buffer zone (total of 200 m). The 200m zone will be based on radial distance from the edge of the airgun array (rather than being based on the center of the array or around the vessel itself). With certain exceptions (described below), if a marine mammal appears within or enters this zone, the acoustic source will be shut down.

The 100 m EZ, with additional 100 m buffer zone, is intended to be precautionary in the sense that it would be expected to contain sound exceeding the injury criteria for all cetacean hearing groups, (based on the dual criteria of $SEL_{cum}$ and peak SPL), while also providing a consistent, reasonably observable zone within which PSOs would typically be able to conduct effective observational effort. Additionally, a 100 m EZ is expected to

minimize the likelihood that marine mammals will be exposed to levels likely to result in more severe behavioral responses. Although significantly greater distances may be observed from an elevated platform under good conditions, we believe that 100 m is regularly attainable for PSOs using the naked eye during typical conditions.

An extended 500 m exclusion zone must be established for all beaked whales, dwarf and pygmy sperm whales, killer whales, a large whale with a calf, and groups of six or more large whales during all survey effort. No buffer zone is required.

*Pre-Clearance and Ramp-Up*

Ramp-up (sometimes referred to as "soft start") is the gradual and systematic increase of emitted sound levels from an airgun array. Ramp-up will begin with one GI airgun 45 cu in first being activated, followed by the second after 5 minutes. The intent of pre-clearance observation (30 minutes) is to ensure no marine mammals are observed within the buffer zone prior to the beginning of ramp-up. During pre-clearance is the only time observations of marine mammals in the buffer zone will prevent operations (*i.e.,* the beginning of ramp-up). The intent of ramp-up is to warn protected species of pending seismic operations and to allow sufficient time for those animals to leave the immediate vicinity. A ramp-up procedure, involving a step-wise increase in the number of airguns are activated and the full volume is achieve, is required at all times as part of the activation of the acoustic source. All operators must adhere to the following pre-clearance and ramp-up requirements:

- The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow PSOs time to monitor the exclusion and buffer zones for 30 minutes prior to the initiation of ramp-up (pre-clearance);

- Ramp-ups shall be scheduled so as to minimize the time spent with the source activated prior to reaching the designated run-in;
- One of the PSOs conducting pre-clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed;
- Ramp-up may not be initiated if any marine mammal is within the applicable exclusion or buffer zone. If a marine mammal is observed within the applicable exclusion zone or the buffer zone during the 30 minutes pre-clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small odontocetes and pinnipeds, and 30 minutes for Mysticetes and all other odontocetes, including sperm whales, pygmy sperm whales, dwarf sperm whales, beaked whales, pilot whales, killer whales, Risso's dolphin);
- PSOs must monitor the exclusion and buffer zones during ramp-up, and ramp-up must cease and the source must be shut down upon detection of a marine mammal within the applicable exclusion zone. Once ramp-up has begun, detections of marine mammals within the buffer zone do not require shutdown, but such observation shall be communicated to the operator to prepare for the potential shutdown.
- If the acoustic source is shut down for brief periods (*i.e.,* less than 30 minutes) for reasons other than that described for shutdown (*e.g.*, mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of marine mammals have occurred within the applicable exclusion zone. For any longer shutdown, pre-start clearance observation and ramp-up are

required. For any shutdown at night or in periods of poor visibility (*e.g.*, BSS 4 or greater), ramp-up is required, but if the shutdown period was brief and constant observation was maintained, pre-start clearance watch is not required.

- Testing of the acoustic source involving all elements requires ramp-up. Testing limited to individual source elements or strings does not require ramp-up but does require pre-start clearance watch.

*Shutdown*

The shutdown of an airgun array requires the immediate de-activation of all individual airgun elements of the array. Any PSO on duty will have the authority to delay the start of survey operations or to call for shutdown of the acoustic source if a marine mammal is detected within the applicable exclusion zone. The operator must also establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch. When the airgun array is active (*i.e.*, anytime one or more airguns is active, including during ramp-up) and (1) a marine mammal appears within or enters the applicable exclusion zone and/or (2) a marine mammal (other than delphinids, see below) is detected and localized within the applicable exclusion zone, the acoustic source will be shut down. When shutdown is called for by a PSO, the acoustic source will be immediately deactivated and any dispute resolved only following deactivation.

Following a shutdown, airgun activity will not resume until the marine mammal has clear the EZ. The animal will be considered to have cleared the EZ if it is visually observed to have departed the EZ, or it has not been seen within the EZ for 15 minutes in the case of small odontocetes and pinnipeds, and 30 minutes for Mysticetes and all other

odontocetes, including sperm whales, beaked whales, pilot whales, killer whales, and Risso's dolphin) with no further observation of the marine mammal(s).

The shutdown requirement can be waived for small dolphins if an individual is visually detected and localized within an exclusion zone. As defined here, the small dolphin group is intended to encompass those members of the Family Delphinidae most likely to voluntarily approach the source vessel for purposes of interacting with the vessel and/or airgun array (*e.g.,* bow riding). This exception to the shutdown requirement applies solely to specific genera of small dolphins-*Delphinus, Stenella,* and *Lissodelphis.*

We propose this small dolphin exception because shutdown requirements for small dolphins under all circumstances represent practicability concerns without likely commensurate benefits for the animals in question. Small dolphins are generally the most commonly observed marine mammals in the specific geographic region and will typically be the only marine mammals likely to intentionally approach the vessel. As described above, auditory injury is extremely unlikely to occur for mid-frequency cetaceans (*e.g.,* delphinids), as this group is relatively insensitive to sound produced at the predominant frequencies in an airgun pulse while also having a relatively high threshold for the onset of auditory injury *(i.e*., permanent threshold shift).

A large body of anecdotal evidence indicates that small dolphins commonly approach vessels and/or towed arrays during active sound production for purposes of bow riding, with no apparent effect observed in those delphinids (*e.g.,* Barkaszi *et al.,* 2012). The potential for increased shutdowns resulting from such a measure would require the *Langseth* to revisit the missed track line to reacquire data, resulting in an overall increase in the total sound energy input to the marine environment and an increase in the total duration over which the survey is active in a given area. Although other mid-frequency hearing specialists (*e.g.,* large delphinids) are no more likely to incur auditory injury than are small dolphins, they are much less likely to approach vessels. Therefore, retaining a

shutdown requirement for large delphinids would not have similar impacts in terms of either practicability for the applicant or corollary increase in sound energy output and time on the water. We do anticipate some benefit for a shutdown requirement for large delphinids in that it simplifies somewhat the total range of decision-making for PSOs and may preclude any potential for physiological effects other than to the auditory system as well as some more severe behavioral reactions for any such animals in close proximity to the source vessel. Visual PSOs shall use best professional judgment in making the decision to call for a shutdown if there is uncertainty regarding identification (*i.e.,* whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger exclusion zone).

Upon implementation of shutdown, the source may be reactivated after the marine mammal(s) has been observed exiting the applicable exclusion zone (*i.e.,* animal is not required to fully exit the buffer zone where applicable) or following a clearance period (15 minutes for small odontocetes and pinnipeds, and 30 minutes for mysticetes and all other odontocetes, including sperm whales, beaked whales, pilot whales, killer whales, and Risso's dolphin) with no further observation of the marine mammal(s).

L-DEO must implement shutdown if a marine mammal species for which take was not authorized, or a species for which authorization was granted but the takes have been met, approaches the Level B harassment zones.

*Vessel Strike Avoidance*

These measures apply to all vessels associated with the planned survey activity; however, we note that these requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply. These measures include the following:

1. Vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A single marine mammal at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should be exercised when an animal is observed. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (specific distances detailed below), to ensure the potential for strike is minimized. Visual observers monitoring the vessel strike avoidance zone can be either third-party observers or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammals from other phenomena and broadly to identify a marine mammal to broad taxonomic group (*i.e.,* as a large whale or other marine mammal);

2. Vessel speeds must be reduced to 10 knots (kn) (5.14 meters per second (m/s)) or less when mother/calf pairs, pods, or large assemblages of any marine mammal are observed near a vessel;

3. All vessels must maintain a minimum separation distance of 100 m from large whales (*i.e.,* sperm whales and all mysticetes);

4. All vessels must attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an exception made for those animals that approach the vessel; and

5. When marine mammals are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (*e.g.,* attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If marine mammals are sighted within the relevant separation distance, the vessel should reduce speed and shift the

engine to neutral, not engaging the engines until animals are clear of the area. This recommendation does not apply to any vessel towing gear.

Based on our evaluation of the applicant's proposed measures, NMFS has determined that the mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

**Monitoring and Reporting**

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);

- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

*Vessel-Based Visual Monitoring*

As described above, PSO observations will take place during daytime airgun operations. During seismic operations, at least three visual PSOs will be based aboard the R/V *Langseth.* Two visual PSOs will be on duty at all time during daytime hours. Monitoring shall be conducted in accordance with the following requirements:

- PSOs shall be independent, dedicated and trained and must be employed by a third-party observer provider;
- PSOs shall have no tasks other than to conduct visual observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of protected species and mitigation requirements (including brief alerts regarding maritime hazards);
- PSOs shall have successfully completed an approved PSO training course appropriate for their designated task (visual);
- NMFS must review and approve PSO resumes accompanied by a relevant training course information packet that includes the name and qualifications (*i.e.,* experience, training completed, or educational background) of the instructor(s),

the course outline or syllabus, and course reference material as well as a document stating successful completion of the course;

- NMFS shall have one week to approve PSOs from the time that the necessary information is submitted, after which PSOs meeting the minimum requirements shall automatically be considered approved;
- PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program;
- PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics; and
- The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted to NMFS and must include written justification. Requests shall be granted or denied (with justification) by NMFS within one week of receipt of submitted information. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored protected species surveys; or (3) previous work experience as a PSO; the PSO should demonstrate good standing and consistently good performance of PSO duties.

PSOs must use standardized data collection forms, whether hard copy or electronic. PSOs must record detailed information about any implementation of mitigation requirements, including the distance of animals to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed

changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

- Vessel name and call sign;
- PSO names and affiliations;
- Date and participants of PSO briefings (as discussed in General Requirement);
- Dates of departure and return to port with port name;
- Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
- Vessel location (latitude/longitude) when survey effort began and ended and vessel location at beginning and end of visual PSO duty shifts;
- Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
- Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions changed significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;
- Factors that may have contributed to impaired observations during each PSO shift change or as needed as environmental conditions changed (*e.g.*, vessel traffic, equipment malfunctions); and
- Survey activity information, such as acoustic source power output while in operation, number and volume of airguns operating in the array, tow depth of the array, and any other notes of significance (*i.e.,* pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, *etc.*).

The following information should be recorded upon visual observation of any marine mammal:

- Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
- PSO who sighted the animal;
- Time of sighting;
- Vessel location at time of sighting;
- Water depth;
- Direction of vessel's travel (compass direction);
- Direction of animal's travel relative to the vessel;
- Pace of the animal;
- Estimated distance to the animal and its heading relative to vessel at initial sighting;
- Identification of the animal (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified) and the composition of the group if there is a mix of species;
- Estimated number of animals (high/low/best);
- Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, *etc.*);
- Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
- Detailed behavior observations (*e.g.,* number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
- Animal's closest point of approach (CPA) and/or closest distance from any element of the acoustic source;

- Platform activity at time of sighting (*e.g.,* deploying, recovering, testing, shooting, data acquisition, other); and
- Description of any actions implemented in response to the sighting (*e.g.,* delays, shutdown, ramp-up) and time and location of the action.

*Reporting*

L-DEO must submit a draft comprehensive report to NMFS on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. A final report must be submitted within 30 days following resolution of any comments on the draft report. The report will describe the operations that were conducted and sightings of marine mammals near the operations. The report will provide full documentation of methods, results, and interpretation pertaining to all monitoring. The 90-day report will summarize the dates and locations of seismic operations, and all marine mammal sightings (dates, times, locations, activities, associated seismic survey activities). The report will also include estimates of the number and nature of exposures that occurred above the harassment threshold based on PSO observations and including an estimate of those that were not detected, in consideration of both the characteristics and behaviors of the species of marine mammals that affect detectability, as well as the environmental factors that affect detectability.

The draft report shall also include geo-referenced time-stamped vessel tracklines for all time periods during which airguns were operating. Tracklines should include points recording any change in airgun status (*e.g.,* when the airguns began operating, when they were turned off, or when they changed from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report,

all raw observational data shall be made available to NMFS. A final report must be submitted within 30 days following resolution of any comments on the draft report.

*Reporting Injured or Dead Marine Mammals*

Discovery of injured or dead marine mammals—In the event that personnel involved in survey activities covered by the authorization discover an injured or dead marine mammal, the L-DEO shall report the incident to the Office of Protected Resources (OPR), NMFS and to the NMFS West Coast Regional Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Vessel strike—In the event of a ship strike of a marine mammal by any vessel involved in the activities covered by the authorization, L-DEO shall report the incident to OPR, NMFS and to the NMFS West Coast Regional Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measure were taken, if any, to avoid strike;

- Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;
- Species identification (if known) or description of the animal(s) involved;
- Estimated size and length of the animal that was struck
- Description of the behavior of the animal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals present immediately preceding the strike;
- Estimated fate of the animal (*e.g.,* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal(s).

*Actions to Minimize Additional Harm to Live-stranded (or milling) Marine Mammals*

In the event of a live stranding (or near-shore atypical milling) event within 50 km of the survey operations, where the NMFS stranding network is engaged in herding or other interventions to return animals to the water, the Director of OPR, NMFS (or designee) will advise L-DEO of the need to implement shutdown procedures for all active acoustic sources operating within 50 km of the stranding. Shutdown procedures for live stranding or milling marine mammals include the following: If at any time, the marine mammal the marine mammal(s) die or are euthanized, or if herding/intervention efforts are stopped, the Director of OPR, NMFS (or designee) will advise the IHA-holder that the shutdown around the animals' location is no longer needed. Otherwise, shutdown procedures will remain in effect until the Director of OPR, NMFS (or designee) determines and advises L-DEO that all live animals involved have left the area (either of their own volition or following an intervention).

If further observations of the marine mammals indicate the potential for re-stranding, additional coordination with the IHA-holder will be required to determine what

measures are necessary to minimize that likelihood (*e.g.,* extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

Additional Information Requests—if NMFS determines that the circumstances of any marine mammal stranding found in the vicinity of the activity suggest investigation of the association with survey activities is warranted, and an investigation into the stranding is being pursued, NMFS will submit a written request to L-DEO indicating that the following initial available information must be provided as soon as possible, but no later than 7 business days after the request for information:

- Status of all sound source use in the 48 hours preceding the estimated time of stranding and within 50 km of the discovery/notification of the stranding by NMFS; and
- If available, description of the behavior of any marine mammal(s) observed preceding (*i.e.,* within 48 hours and 50 km) and immediately after the discovery of the stranding.

In the event that the investigation is still inconclusive, the investigation of the association of the survey activities is still warranted, and the investigation is still being pursued, NMFS may provide additional information requests, in writing, regarding the nature and location of survey operations prior to the time period above.

*Reporting Species of Concern*

To support NMFS's goal of improving our understanding of occurrence of marine mammal species or stocks in the area (*e.g.,* presence, abundance, distribution, density), L-DEO will immediately report observations of Southern Resident killer whales or North Pacific right whales to OPR, NMFS. Although, the likelihood of encountering either species is considered to be rare and unexpected.

**Negligible Impact Analysis and Determination**

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analysis applies to all the species listed in Table 6, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar, except where a species- or stock-specific discussion is warranted. NMFS does not anticipate that serious injury or mortality will occur as a result from low-energy surveys, even in the absence of mitigation, and no serious injury or mortality is authorized. As discussed in the **Potential Effects of Specified Activities on Marine Mammals and their Habitat** section, non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all

potential take will be in the form of Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), responses that are considered to be of low severity, and with no lasting biological consequences (*e.g.,* Southall *et al.,* 2007, 2021). TTS is not expect for most hearing groups (HF, MF, otariids and phocids) and is considered to be highly unlikely for LF cetaceans. Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. As described above, Level A harassment is not expected to occur given the estimated small size of the Level A harassment zones.

In addition to being temporary, the maximum expected Level B harassment zone around the survey vessel is 553 m. Therefore, the ensonified area surrounding the vessel is relatively small compared to the overall distribution of animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the short duration (6 days) and temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

The entire U.S. West Coast within 47 km of the coast is a BIA for migrating gray whale potential presence January to July and October to December. The BIA for northbound gray whale migration is broken into two phases, Phase A (within 8 km of shore) and Phase B (within 5 km of shore), which are active from January to July and

March to July, respectively. The BIA for southbound migration includes waters within 10 km of shore and is active from October to March. All planned survey areas are outside of all gray whale BIAs and no takes of gray whales are authorized. There are also two humpback whale feeding BIAs (Stonewall and Heceta Bank) adjacent to the survey area, however no overlap occurs between the survey area and the BIAs. There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the survey area.

Critical habitat for the Mexico and Central America DPSs of humpback whales has been established along the U.S. West Coast (86 FR 21082; May 5, 2021), and NMFS has expanded the Southern Resident killer whale critical habitat to include coastal waters of Washington, Oregon, and California (86 FR 41668; August 2, 2021). No part of L-DEO's seismic survey will occur in or near these critical habitats.

No permanent hearing impairment (Level A harassment) is anticipated nor authorized. Authorized takes of killer whales is expected to comprise almost entirely of the West Coast Transient and/or North Pacific Offshore stocks as Southern Resident killer whales are typically confined to coastal and inland waters. Therefore take of Southern Resident killer whales is unlikely given the far offshore location of the survey, and no take of Southern Resident killer whales is authorized.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;
- The activity is temporary and of relatively short duration (6 days);

- The anticipated impacts of the activity on marine mammals would be temporary behavioral changes due to avoidance of the area around the vessel;
- No take by Level A harassment is authorized;
- The availability of alternative areas of similar habitat value for marine mammals to temporarily vacate the survey area during the survey to avoid exposure to sounds from the activity is readily abundant;
- The potential adverse effects on fish or invertebrate species that serve as prey species for marine mammals from the survey would be temporary and spatially limited, and impacts to marine mammal foraging would be minimal; and
- The mitigation measures, including visual, shutdowns, and enhanced measures for areas of biological importance (*e.g.*, additional monitoring vessel, daylight operations only) are expected to minimize potential impacts to marine mammals (both amount and severity).

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the activity will have a negligible impact on all affected marine mammal species or stocks.

**Small Numbers**

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our

determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The amount of take NMFS proposes to authorize is below one third of the estimated stock abundance for all species (in fact, take of individuals is less than ten percent of the abundance of the affected stocks, see Table 6). This is likely a conservative estimate because we assume all takes are of different individual animals, which is likely not the case. Some individuals may be encountered multiple times in a day, but PSOs will count them as separate individuals if they cannot be identified.

Based on the analysis contained herein of the activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

**Unmitigable Adverse Impact Analysis and Determination**

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

**National Environmental Policy Act**

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has determined that this action qualifies to be categorically excluded from further NEPA review.

**Endangered Species Act**

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the ESA Interagency Cooperation Division within NMFS' OPR.

The NMFS Office of Protected Resources ESA Interagency Cooperation Division issued a Biological Opinion under section 7 of the ESA, on the issuance of an IHA to L-DEO under section 101(a)(5)(D) of the MMPA by the NMFS OPR Permits and Conservation Division. The Biological Opinion concluded that the action is not likely to jeopardize the continued existence of ESA-listed blue whales, fin whales, sei whales, sperm whales, Central America DPS humpback whales, Mexico DPS Humpback whales, and Guadalupe fur seals. There is no designated critical habitat in the action area for any ESA-listed marine mammal species.

**Authorization**

As a result of these determinations, NMFS proposes to issue an IHA to L-DEO for conducting geophysical surveys in the Northeast Pacific Ocean during summer 2022,

provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: August 2, 2022.

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Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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